

**E. SUMMARY** - The WFF baseline assessment follows:

**1. Trajectories** - Launch azimuths for orbital vehicles (Scout) are normally limited to those between  $90^{\circ}$  and  $129^{\circ}$  azimuth with impact ranges for the third stage of less than approximately 3,500 miles; however, launches outside these limits may be allowed if adequately justified. Sounding rockets are restricted to launch azimuths of from  $90^{\circ}$  to  $165^{\circ}$  and elevation angles of from  $80^{\circ}$  to  $>84^{\circ}$ .

**2. Flight Termination System** - The WFF requirements, procedures and systems provide a satisfactory method of providing public protection from errant vehicles.

**3. Flight Safety Procedures & Data Systems** - The WFF public protection procedures and data systems provide assured public protection for off-range events.

**4. Staffing** - The WFF safety staff is well qualified and the Range Safety Officer training process is complete and comprehensive. A major concern exists in the WFF safety staffing levels necessary to support commercial launch activities. Current levels do not appear adequate to support this program.

**5. Instrumentation** - Tracking radars and telemetry capabilities exist from lift-off until orbital insertion for the Scout vehicle, or until impact for sounding rockets (depending upon vehicle, trajectory and safety requirements). Command destruct capabilities exist until stage 3/4 separation for the Scout and until impact for sounding rockets that require a FTS. Instrumentation limitations may be expanded by the use of mobile units and the instrumentation of other agencies. It is anticipated that any additional requirements for instrumentation/other resources over and above what is normally provided by WFF would be funded by the commercial user.

**6. Vehicle Size** - The WFF can accommodate any sounding rockets in the present inventory as well as a typical Scout size launch vehicle. However, investigations are underway to determine if a scaled down Delta class vehicle could be launched from this site and meet existing safety criteria.

## REFERENCES

1. NASA, A Guide to NASA Wallops Flight Facility, Undated, Wallops Flight Facility, Wallops Island, VA, 23337
2. NASA, NASA Sounding Rocket and Balloon Program Schedule, March 1989, Wallops Flight Facility, Wallops Island, VA, 23337
3. NASA, Provided by Wallops Flight Facility Personnel, 1988, Wallops Flight Facility, Wallops Island, VA, 23337.
4. NASA, Space Utilization Handbook, June 1987, Wallops Flight Facility, Wallops Island, VA, 23337
5. NASA, Instrumentation Handbook, Vol. I, Radar Facilities and Systems, March 1983, Wallops Flight Facility, Wallops Island, VA, 23337.
6. NASA, Instrumentation Handbook, Vol. III, Data Systems and Facilities, December 1986, Wallops Flight Facility, Wallops Island, VA, 23337.
7. NASA, Instrumentation Handbook, Vol. VI, Optical and Photographic Systems, September 1979, Wallops Flight Facility, Wallops Island, VA, 23337.
8. NASA, Range Operations Directive for the Air Force Scout, June 1985, Wallops Flight Facility, Wallops Island, VA, 23337.
9. NASA, Instrumentation Handbook, Vol. II, Telemetry Facilities and Systems, January 1979, Wallops Flight Facility, Wallops Island, VA, 23337.
10. NASA, Instrumentation Handbook, Vol. IV, Communications Facilities /Systems, October 1984, Wallops Flight Facility, Wallops Island, VA, 23337.
11. "Forecast and Inventory: Space", Aviation Week and Space Technology, March 1988.
12. NASA, Safety Plan for Handling/Transfer of Hydrazine (N<sub>2</sub>H<sub>4</sub>) for Scout, Wallops Flight Facility, Wallops Island, VA, 23337.
13. NASA, Air Force Scout Ground Safety Plan, 1985, Wallops Flight Facility, Wallops Island, VA, 23337.
14. U.S.A.F., NASA/DOD Scout Flight Termination System Report, Rev. L, December 1981, Directorate of Safety, Vandenberg AFB, California, 93437.
15. NASA, NASA Sounding Rocket Chronological Launch Data and Failure History, 2 February 1989, Wallops Flight Facility, Wallops Island, VA, 23337
16. NASA, Wallops Flight Facility Sounding Rocket Program, June 1978, Wallops Flight Facility, Wallops Island, VA, 23337
17. NASA, Black Brant X: The Low Cost Development of an Advanced Sounding Rocket System, not dated, Goddard Space Flight Center, Greenbelt, Maryland, 20771
18. NASA, Range Safety Handbook, Goddard Space Flight Center, GHB 1771.1, September 1984, Wallops Flight Facility, Wallops Island, VA, 23337.
19. NASA, Range Safety Policies and Criteria for Goddard Space Flight Center (GSFC)/Wallops Flight Facility(WFF), GMI 1771.1, September 1984, Wallops Flight Facility, Wallops Island, VA, 23337.
20. NASA, Flight Safety/Range Safety Officer Training, 1985, Wallops Flight Facility, Wallops Island, VA, 23337.
21. NASA, Instrumentation Utilization for Risk Control of Safety Operations , Undated, Wallops Flight Facility, Wallops Island, VA, 23337.
22. NASA, Aircraft Hazards Due to Rocket Operations, August 1983, Wallops Flight Facility,

Wallops Island, VA, 23337.

23. Personal knowledge and experience of the following RTI staff: Mr. Loyd C. Parker, Mr. Jerry D. Watson, Mr. James F. Stephenson and Mr. Abe Spinak.

24. SLP, Atlas graphics, Research Triangle Institute, Cocoa Beach, Florida 32931.

25. NASA, Scout Launch History, Wallops Flight Facility, Wallops Island, VA, 23337.

26. NASA, Report on Establishing a Uniform Hazard Criteria and Operating Procedure for Aircraft, October 1967, Wallops Flight Facility, Wallops Island, VA, 23337.

27. NASA, Scout AF Satellite Flight Safety Plan, 1985, Wallops Flight Facility, Wallops Island, VA, 23337.

28. NASA, Emergency Plan for the Scout Vehicle, 1985, Wallops Flight Facility, Wallops Island, VA, 23337.

29. NASA, Range Safety Support Request, 1985, Wallops Flight Facility, Wallops Island, VA, 23337.

30. NASA, Test Directive for Black Brant X, May 1986, Wallops Flight Facility, Wallops Island, VA, 23337

31. NASA, Wind Weighting Data Package for Black Brant X, Nov 1989, Wallops Flight Facility, Wallops Island, VA, 23337